(4) The measured concentration of CO plus \( \text{CO}_2 \) must be greater than or equal to six percent.

(f) When the requirements listed in paragraph (e) of this section have been satisfied, the procedure selected by the Administrator from among the emission tests described in §86.1439 is performed on the test vehicle in accordance with the conditions prescribed in this section and §§86.1430 and 86.1432.

(g) If a certification test vehicle fails its initial confirmatory CST, a retest must be given in accordance with the provisions of §86.091–29(a)(3)(iii)(B)(1) unless the manufacturer withdraws the vehicle from the certification process.

(1) A vehicle receiving a retest must re-enter the confirmatory pathway at either:

(i) The soak time step, as described in §86.1432, or

(ii) The drain and fill step preceding the soak time option, as described in §86.1432(b)(1), using the same type of fuel as was used in the initial CST. The vehicle may optionally be filled to the specified level defined in §86.082 without being drained.

(2) A vehicle receiving a retest must either:

(i) Be maintained in the same ambient temperature range as that specified for the initial confirmatory CST (as described in §86.1430(c)) from the termination of the initial confirmatory CST throughout the retest, or,

(ii) If the vehicle is exposed to ambient temperatures outside of the specified temperature range, before it enters the wait time it must be given a warmup consisting of a full Urban Dynamometer Driving Schedule procedure at the specified ambient temperature range for the initial CST. The test vehicle will be maintained at the same ambient temperature range as that specified for the initial confirmatory CST from this step throughout the remainder of the retest.

(h) Multiple CSTs. The Administrator may elect to conduct more than one type of CST on a test vehicle.

(1) If the Administrator elects to change fuels between one CST and a subsequent CST, the subsequent CST initiates at the drain and fill step described in §86.1432(b)(1).

(2) If the Administrator elects to utilize the same fuel between one CST and a subsequent CST other than a retest, the Administrator may optionally initiate the subsequent CST at the vehicle soak step specified in §86.1432(d).
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terminates immediately, or after an elapsed time of 30 seconds (mt=30), whichever comes second.

(B) The vehicle fails the idle mode and the test is immediately terminated if the requirements of paragraph (b)(1)(i)(A) of this section are not satisfied by an elapsed time of 90 seconds (mt=90).

(2) High-speed mode. This mode follows immediately upon termination of the idle mode.

(i) The mode timer resets (mt=0) when the vehicle engine speed is between 2200 and 2800 rpm. If engine speed falls below 2200 rpm or exceeds 2800 rpm for more than two seconds in one excursion, or more than six seconds over all excursions within 30 seconds of the final measured value used in pass/fail determination, the measured value is invalidated and the mode continued. If any excursion lasts for more than ten seconds, the mode timer resets to zero (mt=0) and timing resumes. The minimum high-speed mode length is determined as described in paragraph (b)(2)(ii) of this section. The maximum high-speed mode length is 90 seconds elapsed time (mt=90).

(ii) The pass/fail analysis begins after an elapsed time of ten seconds (mt=10). A pass or fail determination is made for the vehicle and the mode is terminated in accordance with paragraphs (c)(2)(i) and (ii) of this section.

(A) The vehicle passes the high-speed mode and the test is immediately terminated if, at any point prior to an elapsed time of 90 seconds (mt=90), the measured values are less than or equal to the applicable short test standards as described in § 86.1438(d)(4).

(B) The vehicle fails the high-speed mode and the test is terminated if the requirements of paragraph (c)(2)(i) of this section are not satisfied by an elapsed time of 90 seconds (mt=90).

(c) CST—Idle test. This test consists of an idle sampling mode only. The test timer starts when the conditions specified in § 86.1438(e) are met. The overall maximum test time is 145 seconds (tt=145). The test terminates immediately upon reaching the overall maximum test time. A vehicle that has not yielded passing results by the expiration of the overall test time fails the test.

(1) The mode timer starts (mt=0) when the vehicle engine speed is between 350 and 1100 rpm. If engine speed exceeds 1100 rpm or falls below 350 rpm, the mode timer resets to zero and resumes timing. The minimum mode length is determined as described under paragraph (c)(2) of this section. The maximum mode length is 90 seconds elapsed time (mt=90).

(2) The pass/fail analysis begins after an elapsed time of ten seconds (mt=10). A pass or fail determination is made for the vehicle and the mode is terminated in accordance with paragraphs (c)(2)(i) and (ii) of this section.

(i) The vehicle passes the idle mode and the test is immediately terminated if, at any point prior to an elapsed time of 90 seconds (mt=90), the measured values are less than or equal to the applicable short test standards as described in § 86.1438(d)(4).

(ii) The vehicle fails the idle mode and the test is terminated if the requirements of paragraph (c)(2)(i) of this section are not satisfied by an elapsed time of 90 seconds (mt=90).

(d) CST—Loaded test. This test consists of a loaded sampling mode followed immediately by an idle sampling mode. The test timer starts (tt=0) when the conditions specified in § 86.1438(e) are met, and the gear selector is in ‘drive’ for automatic transmissions, or in second gear (or third gear if more appropriate) for manual transmissions. The overall maximum test time is 240 seconds (tt=240). The test terminates immediately upon reaching the overall maximum test time. A vehicle that has not yielded passing results by the expiration of the overall test time fails the test.

(1) Loaded mode. (i) The mode timer starts (mt=0) when the dynamometer speed is within the limits specified for the vehicle engine size according to the following schedule. If the dynamometer speed falls outside the limits for more than five seconds in one excursion, or 15 seconds over all excursions, the mode timer resets to zero and resumes timing. The minimum mode length is determined as described in paragraph (d)(1)(ii) (A) and (B) of this section. The maximum mode length is 90 seconds elapsed time (mt=90).
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**DYNAMOMETER TEST SCHEDULE**

<table>
<thead>
<tr>
<th>Gasoline engine size, no. cylinders</th>
<th>Roll speed, mph (kph)</th>
<th>Normal loading, brake hp (kilowatts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 or less</td>
<td>22–25 (35–40)</td>
<td>2.8–4.1 (2.1–3.1)</td>
</tr>
<tr>
<td>5 or 6</td>
<td>29–32 (47–52)</td>
<td>6.8–8.4 (5.1–6.3)</td>
</tr>
<tr>
<td>7 or more</td>
<td>32–35 (52–56)</td>
<td>8.4–10.8 (6.3–8.1)</td>
</tr>
</tbody>
</table>

(i) The pass/fail analysis begins after an elapsed time of ten seconds (mt=10). A pass or fail determination is made for the vehicle and the mode is terminated in accordance with paragraphs (d)(1)(i) (A) and (B) of this section.

(A) The vehicle passes the loaded mode if the measured values are less than or equal to the applicable short test standards as described in §86.1438(d)(4) prior to an elapsed time of 90 seconds (mt=90). If the vehicle passes, the mode terminates immediately, or after an elapsed time of 30 seconds (mt=30), whichever comes second.

(B) The vehicle fails the loaded mode and the test is terminated if the requirements of paragraph (d)(1)(ii)(A) of this section are not satisfied by an elapsed time of 90 seconds (mt=90).

(2) **Idle mode.** (i) The mode timer starts (mt=0) five seconds after the dynamometer speed has reached zero and the gear selector is in ‘park’ or ‘neutral’. The minimum idle mode length is determined as described in paragraph (d)(2)(ii) of this section. The maximum idle mode length is 90 seconds elapsed time (mt=90).

(ii) The pass/fail analysis begins after an elapsed time of ten seconds (mt=10). A pass or fail determination is made for the vehicle and the mode terminates as described in paragraphs (d)(2)(ii)(A) and (B) of this section.

(A) The vehicle passes the idle mode and the test is immediately terminated if, at any point prior to an elapsed time of 90 seconds (mt=90), measured values are less than or equal to the applicable short test standards described in §86.1438(d)(4).

(B) The vehicle fails the idle mode and the test terminates if the requirements of paragraph (d)(2)(ii)(A) of this section are not satisfied by an elapsed time of 90 seconds (mt=90).

(e) **CST—Preconditioned idle test.** This test consists of a high-speed preconditioning mode followed immediately by an idle sampling mode. The test timer starts (tt=0) when the conditions specified in §86.1438(e) are met. The overall maximum test time is 200 seconds (tt=200). The test terminates immediately upon reaching the overall maximum test time. A vehicle that has not yielded passing results by the expiration of the overall test time fails the test.

(1) **Preconditioning mode.** The mode timer starts (mt=0) when the engine speed is between 2200 and 2800 rpm. The mode continues for an elapsed time of 30 seconds (mt=30). If engine speed falls below 2200 rpm or exceeds 2800 rpm for more than five seconds in any one excursion, or 15 seconds over all excursions, the mode timer resets to zero and resumes timing.

(2) **Idle mode.** (i) The mode timer starts (mt=0) when the vehicle engine speed is between 350 and 1100 rpm. If engine speed exceeds 1100 rpm or falls below 350 rpm, the mode timer resets to zero and resumes timing. The minimum idle mode length is determined as described in paragraph (e)(2)(ii) of this section. The maximum idle mode length is 90 seconds elapsed time (mt=90).

(ii) The pass/fail analysis begins after an elapsed time of ten seconds (mt=10). A pass or fail determination is made for the vehicle and the mode terminates as described in paragraphs (e)(2)(ii)(A) and (B) of this section.

(A) The vehicle passes the idle mode and the test is immediately terminated if, at any point prior to an elapsed time of 90 seconds (mt=90), the measured values are less than or equal to the applicable short test standards as described in §86.1438(d)(4).

(B) The vehicle fails the idle mode and the test terminates if the requirements of paragraph (e)(2)(ii)(A) of this section are not satisfied by an elapsed time of 90 seconds (mt=90).

(f) **CST—Preconditioned two-speed idle test.** This test consists of a high-speed sampling mode followed immediately by an idle sampling mode. The test timer starts (tt=0) when the conditions specified in §86.1438(e) are met. The overall maximum test time is 290 seconds (tt=290). The test terminates immediately upon reaching the overall maximum test time. A vehicle that has
not yielded passing results by the expiration of the overall test time fails the test.

(1) High-speed mode. (i) The mode timer starts \((mt=0)\) when the vehicle engine speed is between 2200 and 2800 rpm. If the engine speed falls below 2200 rpm or exceeds 2800 rpm for more than two seconds in one excursion, or more than six seconds over all excursions within 30 seconds of the final measured value used in the pass/fail determination, the measured value is invalidated and the mode continued. If any excursion lasts for more than ten seconds, the mode timer resets to zero \((mt=0)\) and timing resumes. The high-speed mode length is 90 seconds elapsed time \((mt=90)\).

(ii) The pass/fail analysis begins after an elapsed time of ten seconds \((mt=10)\). A pass or fail determination is made for the vehicle and the mode is terminated in accordance with paragraphs \((f)(1)(ii)(A)\) and \((B)\) of this section.

(A) The vehicle passes the high-speed mode and the mode is terminated at an elapsed time of 90 seconds \((mt=90)\) if any measured values are less than or equal to the applicable short test standards as described in §86.1438(d).

(B) The vehicle fails the high-speed mode and the test is terminated if the requirements of paragraphs \((f)(2)(i)(i)(A)\) of this section are not satisfied by an elapsed time of 90 seconds \((mt=90)\).

(2) Idle mode. (i) The mode timer starts \((mt=0)\) when the vehicle engine speed is between 350 and 1100 rpm. If the engine speed exceeds 1100 rpm or falls below 350 rpm, the mode timer resets to zero \((mt=0)\) and resumes timing. The minimum idle mode length is determined as described in paragraph \((f)(2)(i)(i)\) of this section. The maximum idle mode length is 90 seconds elapsed time \((mt=90)\).

(ii) The pass/fail analysis begins after an elapsed time of ten seconds \((mt=10)\). A pass or fail determination is made for the vehicle and the mode is terminated in accordance with paragraphs \((f)(2)(i)(i)(A)\) and \((B)\) of this section.

(A) The vehicle passes the idle mode and the test is immediately terminated if, at any point prior to an elapsed time of 90 seconds \((mt=90)\), the measured values are less than or equal to the applicable short test standards as described in §86.1438(d).

(B) The vehicle fails the idle mode and the test is terminated if the requirements of paragraphs \((f)(2)(i)(i)(A)\) of this section are not satisfied by an elapsed time of 90 seconds \((mt=90)\).